

REMARKS

The April 29, 2005 Office Action has been carefully considered, and the claim amendments above together with these remarks are presented in a bona fide effort to respond thereto and address all issues raised in that Action. Claim 27 has been amended, and the other rejected claims have been replaced with new claims 30-39. It is believed that the specification and original claims provide clearly evident support for the amended language of claim 27 and for new claims 30-39, therefore the amendments should not raise any concerns regarding new matter or support in the written description. Prompt favorable reconsideration is requested.

A. Claim 27

The Office Action rejected claim 27 under 35 U.S.C. § 103 as unpatentable over US patent no. 4,485,486 to Webb et al. (hereinafter Webb) in combination with US patent no. 6,611,511 to Schulz, US patent no. 5,952,963 to Shen et al. (hereinafter Shen) further in combination with US patent no. 5,023,900 to Tayloe et al. (hereinafter Tayloe). However, it is noted that the claim had been allowed in earlier Actions (see e.g. section #8 on page 17 of Detailed Action dated August 6, 2005) when it referred to a “coverage map.” By amendment above, Applicants have changed both occurrences of “coverage profile” to “coverage map.” Hence, claim 27 should be allowable as in the earlier Actions.

The rejection (section 6 of the Detailed Action) asserted that Tayloe suggests performing an operation for finding of a mobile station in a cellular system “that includes a signal coverage profile (paragraph bridging pages 9 and 10 of the Detailed Action). In point of fact, however, Tayloe does not teach use of a coverage map to determine mobile station location. To the contrary, the Tayloe patent actually teaches measurement of signal strength and timing, at a base station, to determine mobile station position (column 3, lines 46-50). By tracking location and

monitoring signal strengths during calls, Tayloe develops a map of coverage characteristics (column 5, lines 19-27). Tayloe relates to systems diagnostics (see title). For diagnostic purposes, Tayloe maps system coverage from tracking of mobile positions. Tayloe does not teach comparing the received signal strength from at least one sector antenna against the cell-site signal coverage map, as part of the determination of the location of the mobile station.

For at least the reasons outlined above it is believed that claim 27 patentably distinguishes over the art. In particular, it is respectfully submitted that the four combined documents do not fairly suggest steps implemented by the program, as recited in amended claim 27, for example, where the determining of the location of the mobile station involves comparing the received signal strength from at least one sector antenna against the cell-site signal coverage map along with the predicted movement of the mobile station. Withdrawal of the rejection of claim 27 is respectfully requested.

B. The Other Art Rejection

The Office Action rejected claims 16, 18, 19, 26 and 29 under 35 U.S.C. § 103 as unpatentable over Webb in combination with Schulz, further in combination with Shen. These rejected claims have been replaced with new claims 30-39, of which claim 30 is a new independent method claim and claim 33 is a new independent system claim. It is respectfully submitted that the new claims patentably distinguish over the proposed three-way combination of Webb, Schulz and Shen.

More detailed explanations of patentability of the method claims (30-32) and system claims (33-39) are set forth below.

1. Patentability of Method Claims 30-32

Independent claim 30 relates to a method for performing a hand-off of a mobile station in a cellular system having base stations at cell sites. One of the base stations includes a smart antenna system having plural sector antennas. The method involves receiving spread-spectrum signals from the mobile station via one or more of the sector antennas of the smart antenna system. Signal strengths of the received spread-spectrum signals are processed, so as to calculate a rate of change for each signal received via a sector antenna of the smart antenna system. Movement of the mobile station is assessed, based on the calculated rates of change. When strength of the signal received from the mobile station at one sector antenna reaches a threshold, the method selects a type of hand-off. The claim recites that the handoff type is selected from among two specified types of hand-off, (1) a hand-off between two different serving sectors or sector antennas of the smart antenna system, and (2) a hand-off from the one base station to a base station of an adjacent cell site. This handoff type selection is based on the assessment of the movement of the mobile station, which as noted earlier, was based on the calculated rates of change. The claim also recites handing the mobile station off, in accord with the selected type of hand-off. It is respectfully submitted that this methodology would not have been obvious, in the legal sense of 35 U.S.C. § 103, over the applied Webb, Schulz and Shen patents.

The Webb et al. patent discloses a technique for assigning channels through a smart antenna system and controlling handoff operations. A microprocessor controlled base site controller periodically monitors the mobile station signal strength. When signal strength degradations are detected, the controller either changes the base station sector antennas coupled to voice transceivers, increases or decreases radiotelephone power output, or hands the radiotelephone off to another cell. The only 'handoff' decision is whether to handoff to another

cell (see steps 486 in Fig. 3d and steps 462 and 464 in Fig. 3c). Webb has a decision to switch sector antennas (464), but as actually discussed by Webb, this change is somehow different from a handoff (compare to 486). Webb does not treat switching sector antennas as another type of handoff. Hence, Webb does not actually teach the two types of “handoff” recited in the claim or selection between those handoff types.

Schulz teaches changing an antenna configuration for communication with the mobile station as it moves, however, the only assessment of movement depends on where or in what different locations the mobile station is ‘found’ (see column 4, lines 1-21). The Examiner correctly recognizes that the combination of the Webb and Schulz patents does not teach controlling hand-off based on calculated rates of signal changes.

Instead, the art rejection alleges that Shen would lead one of skill in the art to implement “a selection criteria for selecting an antenna based on the rate of signal changes” in the proposed combination of Webb and Schultz “so as to initiate hand-off before the signal quality declines and avoid complete loss of communication.” This is not enough teaching to make up for the deficiencies of the combination of Webb and Schulz.

Even if all three patent teachings are combined, it is believed that the result would not satisfy all of the limitations of independent claim 30. Webb controls sector antenna selections and hand-off based on detected signal strength. Schulz teaches changing antenna configuration based on where a mobile station is found (column 4, lines 1-21), and Shen only teaches selecting an antenna from a diversity of antennas based on multiple criteria, including a gradient error vector, which represents the magnitude of the received signal’s rate of change. The combination of these three features from the patents would not result in a technique that selects a type of handoff, where the selection of whether (1) to hand-off between two different serving sectors or

sector antennas of the smart antenna system or (2) to hand-off from the one base station to a base station of an adjacent cell site, is based on assessment of the movement of the mobile station that in turn was based on the calculated rates of change of signal strengths received via the various sector antennas, as required by claim 30.

For at least these reasons, it is believed that new claims 30-32 patentably distinguish over the applied patents to Webb, Shulz and Shen; and these new claims should be in condition for allowance.

2. Patentability of System Claims 33-39

Independent claim 33 relates to a mobile wireless communication system for providing communication service for a mobile station. The claimed system comprises linked base stations at cell sites, wherein one of the base stations comprises a smart antenna system. The smart antenna system includes sector antennas and a spread-spectrum transmitter configured to transmit spread-spectrum signals to be radiated from any one of the sector antennas. A spread-spectrum receiver is configured to process signals received from the mobile station by the sector antennas. The signals are received at any of the of sector antennas while one or more of the sector antennas are radiating.

The recited smart antenna system also includes a controller coupled to control operation of the one base station and configured for performing several specified functions. In particular, signal strengths of the received spread-spectrum signals are processed to calculate a rate of change for each signal received via a sector antenna of the smart antenna system. Movement of the mobile station is assessed, based on the calculated rates of change. When strength of the signal received from the mobile station at one sector antenna reaches a threshold, the controller

selects a type of hand-off. As in claim 30, this claim recites that the handoff type is selected from among two specified types of hand-off, (1) a hand-off between two different serving sectors or sector antennas of the smart antenna system, and (2) a hand-off from the one base station to a base station of an adjacent cell site. The controller bases this handoff type selection on its assessment of the movement of the mobile station, which as noted earlier, was based on the calculated rates of change. The independent system claim also recites handing the mobile station off, in accord with the selected type of hand-off.

It is respectfully submitted that this methodology would not have been obvious, in the legal sense of 35 U.S.C. § 103, over the applied Webb, Schulz and Shen patents. As noted above, Webb controls sector antenna selections and hand-off based on detected signal strength; Schulz teaches changing antenna configuration based on where a mobile station is found (column 4, lines 1-21); and Shen only teaches selecting an antenna from a diversity of antennas based on multiple criteria, including a gradient error vector, which represents the magnitude of the received signal's rate of change. The combination of these three features from the patents would not result in a system where the controller of the smart antenna system makes its selection of whether (1) to hand-off between two different serving sectors or sector antennas of the smart antenna system or (2) to hand-off from the one base station to a base station of an adjacent cell site, based on assessment of the movement of the mobile station that in turn was based on the calculated rates of change of signal strengths received via the various sector antennas, as required by claim 33.

For at least these reasons, it is believed that new claims 33-39 patentably distinguish over the applied patents to Webb, Schulz and Shen; and these claims should be in condition for allowance.

C. Conclusions

Upon entry of the above claim amendments, claims 27 and 30-39 should be active in this application, and all of those claims should be in condition for allowance. Accordingly, this case should now be ready to pass to issue; and Applicants respectfully request a prompt favorable reconsideration of this matter.

It is believed that this response addresses all issues raised in the April 29, 2005 Office Action. However, if any further issue should arise that may be addressed in an interview or obviated by an Examiner's amendment, it is requested that the Examiner telephone Applicants' representative at the number shown below.

To the extent necessary, if any, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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